

by the Italian naval officer, Lieut. Bove. *Apropos* of recent troubles between Chili and Bolivia is an article, with map, on the desert of Atacama. Among the information in the *Monatsbericht* are a number of important data as to the heights of various places in Japan.

At the last annual meeting of the Swiss Alpine Club the following resolutions were adopted :—(1) The club determines for six years the field of its excursions as follows :—The high Alps between the cantons of Berne and Valais to be explored from west to east in three parts : the Lenk with its neighbourhood, the Blummis-alp, and the glacier of Aletsch and the Jungfrau as far as Grindelwald ; (2) A series of lectures will be opened for the guides ; (3) The central committee will publish all interesting documents collected until now as to the motion of glaciers, with bibliographical notes on former publications on this subject.

THE new number of the Geographical Society's monthly periodical contains Mr. Keith Johnston's "Notes of a Trip from Zanzibar to Usambara, in February and March, 1879," illustrated by an excellent little map, which has been reduced from the original drawing sent home by him. These and the other reports and maps connected with his preliminary work, and published in a previous number, were, as the editor very truly remarks, "a sure promise of great things to come when he should have traversed the unknown regions of the interior," and show very clearly how great a loss geography has sustained by Mr. Johnston's premature death. Notes on the geology of Usambara, collected during the same journey, are by Mr. J. Thomson, the geologist and naturalist of the East African expedition, who has now taken Mr. Johnston's place. The "Lecture on the Origin of the Flora of the European Alps," by Mr. John Ball, F.R.S., occupies a considerable portion of the present number. The geographical notes do not this month contain anything very striking, but some of them are good, especially those relating to Col. Grodekof's and M. Oshanin's expeditions, and to the exploration of the Sanpo River and Count Szeményi's further attempt to reach Lob-Nor from China. We would also call particular attention to the obituary notice of Mr. Keith Johnston. The rest of the number is chiefly occupied with the presidential address in the Geographical Section of the British Association.

A PROPOSAL similar to the often-ventilated plans of a sea in the great Sahara has been recently made by the Governor of the State of Arizona, in North America. It is suggested that a short canal should be constructed which would admit the waters of the Pacific to a large and low-lying area of land situated between Arizona and Southern California. The district is quite a desert at present, and is believed to be the bed of an ancient lake. It measures some 200 miles in length and 50 miles in breadth; its level is estimated to be about 300 feet below that of the Pacific. Its western boundary is at only 45 miles distance from the Gulf of California, and as on this part, where the canal would have to be built, there is already a lake of 20 miles length, the length of the actual canal would be reduced to 25 miles. The cost of the undertaking would amount to about 200,000*l.*, and the work could be completed in six months. The importance of an undertaking of this kind need not be pointed out.

WE learn by telegram from New York that Commander Lull, U.S.N., has read a paper before the American Science Association, on his recent explorations in connection with the proposed ship-canal through the Panama Isthmus. He considers that the only practicable routes are those *via* Nicaragua and Panama, and that locks will be indispensable. Commander Lull gives a decided preference to the Nicaragua route.

THE last number of the *Izvestia* of the Russian Geographical Society contains much interesting information

as to the meetings of the Society and of its sections. Unhappily, all the proceedings are very old, as we do not find anything more recent than from February 6 to May 30 of last year. It is a pity that the Society does not publish its interesting proceedings immediately after the meetings.

M. HOEVERT has undertaken a valuable work, the compilation of a complete bibliography of all works relative to the geography of Russia published till now. He has already finished the revision of the libraries of the Geographical Society of the Academy of Sciences (which receives *all* Russian works published), and of the General Staff.

WITH a view to turning the island to profitable account, a Saghalien Fishing Association has been established under licence from the authorities at St. Petersburg, and vessels for the purpose are being built or chartered in Japan. The business is expected to prove a very lucrative one.

THE caravan of Capt. S. Martini, whilst on its way to convey supplies to the Italian African expedition, has been attacked by the Somalis tribe and robbed of all its merchandise at a distance of some six day's march from Zeila.

NOTES

THE eighth general meeting of the German Astronomical Society took place at the lecture hall of the Royal Academy of Sciences at Berlin on the 5th inst., under the presidency of Prof. Krüger, Director of the Gotha Observatory. Numerous guests from England, France, Belgium, Holland, Russia, Sweden, Denmark, and Austria were present. The Minister for Public Instruction, Herr von Puttkammer, welcomed the assembly in the name of the German Government. We shall refer to the meeting in a future number.

A SMART shock of earthquake was felt in the neighbourhood of Szegedin (Hungary) on September 3.

AN announcement made by the Society of Arts states that the Society offers the Fothergill gold medal for the best means of protecting ships from loss by fire and by sinking, and a silver medal for the protection of ships from either calamity.

A PAMPHLET containing a collection of necrological notices of the late M. Victor Masson, formerly principal of the eminent Paris publishing firm, has recently been published in Paris. The deceased died at his country house of Chassagne (Côte d'Or) on May 3 last, at the age of seventy-two years. His name was well-known in all scientific circles, as he held the highest place among scientific publishers of the French capital. Personally he was greatly esteemed by all who knew him, his relations with men of science were ever of the most liberal, friendly, and upright character, and the care and elegance with which he brought out the scientific works entrusted to him always deserved special praise.

ON the 25th inst. the Pompeii celebration, to which we referred some time ago, will take place. The director of archaeological excavations in Italy, Prof. Michele Ruggiero, will deliver a historical address to the assembled guests in the basilica of the ruined city. Hereupon he will lead them through the entire area hitherto laid bare, and afterwards some excavations will be made in presence of the guests.

THE Clothworkers' Company have voted 3,500*l.*, beyond the 10,000*l.* previously voted, to cover the complete cost of that portion of the buildings of the Yorkshire College of Science, Leeds, which will be required for the teaching of the sciences applied to the textile industries and dyeing. They have further agreed to maintain the buildings and the operations in full effect for a period of five years from January 1 next, at a cost of 1,200*l.* per annum.

PROF. A. H. CHURCH commences a course of ten lectures on the Chemistry of Food next Monday, the 15th inst., at five o'clock, at the National Training School for Cookery, Exhibition Road, South Kensington. Mr. Church has been appointed Professor of Chemistry at the Bedford College (for ladies), York Place, Portman Square.

THE sixth Congress of Russian Naturalists promises to be very interesting, not only as to the scientific communications expected, but also as to its practical results. It is proposed to form a permanent Commission of representatives of all Russian scientific societies for the exploration of little-known parts of Russia as to their natural history and geology, with the special aim of the applications of science to agriculture and mining industry. Another Commission will be nominated for the diffusion of science among the masses of the people by means of a series of systematical lectures. A group of Russian explorers of the North proposes to form at the Congress of Naturalists a special section for all questions connected with the exploration of the North of Russia and Siberia.

THE *Courier de Tlemcen* (near Algiers) describes an interesting if somewhat fabulous discovery. It states that some miners occupied in blasting rocks in the vicinity of the picturesque cascades, discovered the entrance to a cave, the floor of which was covered with water. They ventured upon the subterranean river on a raft, and followed it for some 60 metres' distance, when it disappeared in a vast lake. Here the vault of the cave was very high and covered with stalactites. In many parts the miners had to steer their raft between colossal stalactites which reached down to the surface of the water; eventually they reached the end of the lake, where they noticed a canal extending towards the south, and into which the waters of the lake flowed. The workmen estimate the length of the lake to be 3 kilometres, and the breadth about 2 kilometres. They brought out a quantity of fish, which, they say, surrounded the raft, and which were found to be blind.

THE optical structure of ice forms the subject of a recent paper by Herr Klocke, in the *Neues Jahrbuch für Mineralogie* (1879, p. 272). He confirms M. Bertin's observation, that in formation of ice the optic axis of the crystal is placed at right angles to the surface whence the cooling proceeds; and this was the case with water at rest in a freezing mixture. Only the ice-flowers which first cover the sides of the vessel have their principal axis parallel to these. M. Bertin affirmed that the first thin ice-layer forming on water which freezes in an open vessel in cold air has a confused crystallisation, and only after thickening takes a determinate orientation. Herr Klocke differs from him here. He shows that the first needles shooting over the surface are formed parallel to the principal axis, and that then ice-plates are added to their sides, whose optic axis is at right angles to the surface of the water. In the enlargement of these lateral plates to the table of ice extending over the whole water surface, this orientation is preserved from the commencement. Tables of ice quickly formed under disturbing influences or in great cold, as also various plates of sea-ice, showed, on the other hand, aggregate polarisation. Various other observations are described.

WE hear that the preliminary operations for opening the coal-mines in the Kaiping department of the Chinese province of Chihli, to which we have before referred, are proceeding satisfactorily. From borings made last winter it would appear that six seams of good coal can be reached, and the construction of two shafts has been commenced. Good clay has been found close at hand, from which bricks will be made for lining the lower parts of the shafts, the upper portions being faced with stone already prepared for the purpose. Machinery and some miners were shortly expected to arrive from Europe, and the work would then be rapidly pressed forward.

THE temperature of the polar extremities of carbons giving the electric light has been recently investigated by M. Rossetti (*Journ. de Phys.*, August), using the same method and instruments as he used in measuring the temperature of the sun. (The face of a thermo-electric pile is placed at suitable distance to receive rays from a radiating surface of determinate size, and the thermal effect is measured by a very sensitive Wiedemann reflecting galvanometer; the temperature is deduced by means of a formula previously established.) We give, briefly, the author's conclusions:—(1) The positive carbon pole, at the moment of production of the light, has always a higher temperature than the negative. (2) These temperatures vary according to variation of the current's intensity. (3) They are higher the smaller the radiating surface, provided, of course, it comprises the extremity of the point. (4) For the negative pole the minimum temperature was $1,910^{\circ}$ C., the radiating surface being large and, in part, of small brilliancy; the maximum $2,532^{\circ}$ C., the radiating surface being half the preceding. (5) For the positive pole, the minimum temperature was $2,312^{\circ}$, the carbon being very large and the radiating surface very extensive; the maximum $3,200^{\circ}$ when the carbon was thin and the radiating surface nearly a quarter of that corresponding to the minimum temperature. (6) We may consider the temperature of the extreme negative polar point as equal to $2,500^{\circ}$ at least; that of the positive polar extremity is not less than $3,200^{\circ}$.

ON Saturday last a system of telephonic communication highly promising for the convenience of business men and others was successfully inaugurated in London. The telephone used is that of Edison (the loud speaking telephone), with the nature of which our readers are acquainted. A central station called the Telephone Exchange, in Lombard Street, is put in connection at present with ten private offices furnished with telephones in various parts of the city. The switch-board at the central office might be connected with twenty-four different stations, this being the most that can be attended to by one person. Any number of switch-boards, however, might be added in the same room, and any station on one board connected with any one on another board. An attendant, who may be a boy, sits in front of the board. Supposing No. 2 wishes to speak with No. 6, the person at No. 2 calls the attention of the central attendant by means of an electric bell, while a falling shutter on the switch-board shows the number of the applicant. The attendant responds, and No. 2 then says, "Connect me with No. 6." The shifting of a pin effects this, and Nos. 2 and 6 are left to communicate with each other. When the conversation is closed, No. 2 signals by the bell that he has finished, and the attendant, removing the pin, separates the two stations. And so with any other numbers. Of course only one station can be connected with another at the same time, but the process of coupling and uncoupling is effected very quickly. Edison's instrument, though known as the loud-speaking telephone, is also suited for conversation almost in whispers, and this was tested on Saturday with very satisfactory results. The telephone is said to have been worked in America without difficulty between stations 100 miles apart. It is considered that up to about five miles distance there is no loss of power; and in practice of the above system even five miles would probably be found an exceptional distance. The utility of the system seems fully demonstrated, and we may look for an extensive application of it in our large towns.

THE common form of speaking telephone relies for its action on currents of electricity developed in helices by the varying strength of magnetic induction when an armature moves in the magnetic field. A second genus of telephone is that which Edison has developed out of his motograph, and which depends solely on the varying friction between two surfaces, one of which is an electrolyte; when a varying current is passed between them.

Prof. Dolbear has recently (*Journ. of Frankl. Inst.*) described a third genus of telephone quite unlike the other two. A short, straight bar electro-magnet is furnished with a crank, so that it may be rotated within its coil. Lying on the poles are the ends of a bent armature (of horse-shoe form), the back of which is fastened to a plate of mica, or paper, or thin iron, mounted as in ordinary receivers, so that any motion of the armature poles will be imparted to the plate. When a current traverses the bobbin, the straight bar becomes a magnet, with strength proportionate to the strength of the current, and the armature adheres to the poles of it with a certain strength of adhesion. Now let the crank be turned slowly, and the adhesion of the armature will result in stretching the plate, and the cessation of the current will let the plate regain its former position through its elasticity. A varying current will result in varying adhesions and consequent vibrations of the plate, and talking may be plainly heard with an instrument constructed thus. Prof. Dolbear calls it the *Rataphone*. Of course there are various ways in which the principle may be utilised.

IN the last number of the *Astronomische Nachrichten* Dr. Hermann J. Klein, of Cologne, publishes some further remarks regarding the new formations near the lunar crater Hyginus, which were first noticed by him, and about which there has been so much discussion in astronomical circles of late. Dr. Klein, after giving some valuable selenographical details (for which we must refer our readers to the serial mentioned), observes that for the present it must remain undecided whether the new formations near Hyginus are due to volcanic action. As far as his knowledge extends, only one observation of lunar changes may be ascribed to phenomena of a volcanic nature. This observation was made by Schröter and Olbers on July 2, 1797, and referred to a mountain, V, in the Mare Vaporum. The mountain was found to be 3,450 feet in height, and has never again been seen; it was probably only a mass of vapour. Almost at the very spot where this mysterious object was observed a crater is now visible. Dr. Klein is of opinion that at the surface of the moon masses of vapour are formed now and then and are of considerable duration, and he lays particular stress on the fact that for certain processes taking place upon our satellite all analogy with terrestrial phenomena is completely wanting. As an instance he points to the occasional occurrences at the double crater Messier. Those who are acquainted with the entire materials collected by observations of this formation, from Gruithuisen down to Schmidt, and who have themselves for some time observed the crater and its appendages, will own that here they stand before an unsolved enigma, and that, for the present, at least, it is the wisest course to abstain from any attempt at explaining the wonderful phenomena which are taking place in those regions.

THE Austrian geologists are very busy at present with the excavations which are being made in the Moravian caves of Stemberg and Brünn. A few miles from the latter town the celebrated Vypustek cave is situated. This is now being investigated by order of the Imperial Academy of Sciences of Vienna, and has been repeatedly visited by Prof. von Hochstetter. The Imperial Museum at Vienna has quite recently received a collection of bones of the cave-bear, of the cave-hyæna, and of other prehistoric inhabitants of the Vypustek cave.

IN a recent number we referred to the tides observed in the subterranean waters of a coal mine at Dux, Bohemia. A similar phenomenon is reported from America, where it was observed in an artesian well some months ago. A Vienna geologist therefore recommends that observations should be made at the artesian wells in Europe, to ascertain whether similar phenomena would show themselves.

IN an article in the August number of the *Entomologist's Monthly Magazine*, on the recent abundance of *Vanessa cardui*

over a great part of Europe, Mr. McLachlan suggests that possibly "the insect may be able to rest quiescent in the perfect state over a series of years, until the accumulated numbers simultaneously wake up."

THE Russian Commercial and Technical Societies propose to send to the Berlin International Fishing Exhibition several collections of living fishes and detailed descriptions of the fishing in Russia.

IN the last (August) number of the *Annali di Chimica applicata alla Medicina* of Dr. G. Polli of Milan, an interesting note by Dr. Finardi Sante of Salara (Rovigo), reports the discovery of a new method of conserving chloride of lime unchanged, i.e., free from carbonate or moisture. It consists in placing into the jars containing this substance a small vessel containing a mixture of salicylic acid and salicylate of potash, then closing the jars with a non-porous stopper and preserving them in the dark.

WE have received the *Anuario del Observatorio de Madrid* for 1876 and 1877; it contains much useful astronomical and statistical information. We have also received the meteorological publications of the same observatory for 1875-8; these we hope to notice at length.

DURING a thunderstorm at St. Cergues, in the Jura, the rare phenomenon known as St. Elmo's fire was observed. A pine forest in that neighbourhood is reported to have appeared as if on fire, presenting a magnificent aspect.

A STEP in the right direction has been taken by the citizens of Colorado in the formation of a Historical and Natural History Society at Denver. The leading citizens of the State have become members of the new society, the main object of which is the preservation of records, documents, relics, &c., referring to the State of Colorado. The accumulation of works on natural history and of specimens illustrating the natural wealth of the State is another object the Society has in view.

IN a note to the Berlin Physiological Society, Herr Fritsch, after remarking on the difficulty of rendering bacteria in infected tissues visible, recommends Abbé's illuminating arrangement for the purpose. This consists of a hemispherical lens-system, the plane surface of which is placed close under the object. To the middle point of the system is directed a considerable quantity of daylight by means of a plane mirror, and the intensity is so regulated that, with different combinations, differently incident cones of rays are obtained.

THE additions to the Zoological Society's Gardens during the past week include a Tiger (*Felis tigris*), two Indian Leopards (*Felis pardus*), from India, presented by His Excellency the Right Hon. Lord Lytton, G.C.B., G.M.S.I.; a Macaque Monkey (*Macacus cynomolgus*), a Bonnet Monkey (*Macacus radiatus*) from India, presented by Mr. B. Raver; two great Bustards (*Otis tarda*) from Andalusia, presented by Mr. Forster; two Alf Green Parrakeets (*Brotogeris tiriacula*) from Brazil, presented by Dr. A. Stradling; two Common Chameleons (*Chamaeleon vulgaris*) from Cyprus, presented by Mr. Alfred Ely; a European Bearded Vulture (*Gypaetus barbatus*) from Spain, deposited; a Scemmering's Gazelle (*Gazella Scemmeringii*) from Abyssinia, a Rock Cavy (*Cereodon rupestris*), a Crab-eating Opossum (*Didelphys cancrivorus*), an Ashy-headed Goose (*Bernicla poliocephala*), an Upland Goose (*Bernicla magellanica*) from South America, a Superb Tanager (*Calliste fastuosa*), a Black-shouldered Tanager (*Calliste melanota*), a Palm Tanager (*Tanagra palmarum*), a Thick-billed Violet Tanager (*Euphonia crassirostris*), a Brazilian Blue Grosbeak (*Guiraca carulea*), two Tuberculated Iguanas (*Iguana tuberculata*), two Horrid Rattlesnakes (*Crotalus horridus*) from Brazil, two Elegant Parrakeets (*Euphema elegans*), from South Australia, two King Crabs (*Limulus polyphemus*) from North America, purchased.